

Application No. 10/808,691
Response dated December 11, 2007 to
Office Action mailed September 11, 2007

REMARKS

The Examiner has rejected claims 1-5, 8-13 and 16-17 under 35 U.S.C. § 112, first paragraph as failing to comply with the enablement requirement. Claims 1, 8 and 9 are rejected under § 103(a) as being unpatentable over Hattori et al. in view of Su et al. and Niino et al. Claims 2-4, 10-12 and 16-17 are rejected under § 103(a) as being unpatentable over Hattori et al. in view of Su et al. and Niino et al., and further in view of Parkhe et al. Claims 5 and 13 are rejected under § 103 as being unpatentable over Hattori et al. in view of Su et al., Niino et al. and Parkhe et al., and further in view of Ghanayem et al.

Claims 1 and 10 (and withdrawn claims 18 and 32) are amended herein to recite that the power is RF power. By this amendment, it is asserted that all claims comply with the enablement requirement, and thus, Applicants respectfully request withdrawal of the rejection under § 112.

With respect to the rejection of claims 1, 8 and 9 as being obvious over Hattori et al. in view of Su et al. and Niino et al., Applicants respectfully traverse. The rejected claims are directed to a batch-type processing system in which the process chamber includes a process tube that surrounds a substrate holder adapted to hold a plurality of vertically stacked wafers, commonly referred to as a wafer boat. In the prior art, for batch processing, plasmas have been generated remotely and fed into the chamber. The present inventors found that this remotely generated plasma loses its effectiveness at cleaning plural wafers because of the transport required from the plasma source into the chamber to the component to be cleaned.

Hattori et al. and Su et al. are each directed to a single wafer processing system in which power is applied to the substrate holder (the electrostatic chuck), which is adapted to hold a single wafer for processing in the chamber. In Hattori et al., the plasma is generated for the purpose of eliminating residual charges on the substrate holder, and etching of the holder material to remove dust from the holder to maintain a flat surface for the single wafer is a secondary benefit. Su et al. is also directed to the single wafer processing system having an

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electrostatic chuck for holding a single wafer for processing. Su et al. is specifically directed to plasma processing of wafers serially, i.e., one at a time, in a continuous process with intermediate plasma cleaning of the substrate holder (chuck) between wafers. Neither Hattori et al. nor Su et al. disclose a processing system in which a process tube within the process chamber surrounds a substrate holder adapted to hold a plurality of vertically stacked wafers for batch processing.

Niino et al. discloses a batch processing system that specifically aims to avoid plasma in its cleaning process. Rather, it is a dry cleaning process that has the benefit that it "can be performed by etching using ClF_3 without producing a plasma." Col. 10, lines 42-44. There is no suggestion to modify the chamber and the single-wafer designed electrostatic chuck in the plasma processing system of Hattori et al. or Su et al. to enable batch processing based on Niino et al., which specifically and purposefully does not produce plasma. Moreover, at best, the combination might suggest removing the electrostatic chuck to which power is applied and replacing it with a wafer boat holder to which no power is applied. Thus, the combination does not produce the claimed invention. There is simply no teaching, suggestion or motivation to combine the references as done here, and the combination furthermore does not achieve the invention. Therefore, there is no *prima facie* case of obviousness, and it is respectfully requested that the rejection of claims 1, 8 and 9 as being obvious over Hattori et al. in view of Su et al. and Niino et al. be withdrawn.

With respect to the rejection of claims 2-4, 10-12 and 16-17 as being obvious over Hattori et al. in view of Su et al. and Niino et al. and further in view of Parkhe et al., Applicants respectfully traverse. Claims 2-4 are allowable for at least the reasons provided above as to claim 1. Like Hattori et al. and Su et al., Parkhe et al. is directed to a processing system having a single wafer electrostatic chuck, and thus does nothing to cure the deficiencies recited above for claim 1.

Rejected claim 10 and its dependent claims are directed to a batch-type processing system in which the process chamber includes a process tube that surrounds a substrate holder adapted to hold a plurality of vertically stacked wafers, where RF power is

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applied to the process tube. Examiner seems to have overlooked a difference between the scope of independent claim 1 and independent claim 10. While the RF power can be applied to any one of the substrate holder, the substrate holder support, or the process tube in claim 1, claim 10 specifies that the RF power is applied to the process tube. Thus, claims 10-13 are not substantial duplicates of claims 2-5 as indicated at page 2 of the Action, but rather are more narrow in scope with respect to the application of power.

None of the references cited teach or suggest applying power to the process tube within the chamber that surrounds a substrate holder adapted to hold a wafer boat. The single-wafer systems of Hattori et al., Su et al., and Parkhe et al. each apply the power to the substrate holder and none contain a process tube. Niino contains a process tube and a substrate holder, but applies power to neither component. There is simply no teaching or suggestion in the cited art of powering the process tube to form cleaning plasma in a batch-type processing system. The combination does not arrive at the claimed invention of claim 10 and its dependent claims. There being no *prima facie* case of obviousness, it is respectfully requested that the rejection of claims 2-4, 10-12 and 16-17 as being obvious over Hattori et al. in view of Su et al. and Niino et al. and further in view of Parkhe et al. be withdrawn.

In view of the foregoing amendments to the claims and remarks given herein, Applicants respectfully believe this case is in condition for allowance and respectfully request allowance of the pending claims. If the Examiner believes any detailed language of the claims requires further discussion, the Examiner is respectfully asked to telephone the undersigned attorney so that the matter may be promptly resolved. The Examiner's prompt attention to this matter is appreciated.

With respect to the rejection of claims 5 and 13 as being obvious over Hattori et al. in view of Su et al., Niino et al. and Parkhe et al., and further in view of Ghanayem et al., Applicants respectfully traverse. Claims 5 and 13 are allowable for at least the reasons provided above as to claims 1 and 10 from which they respectively depend. Like Hattori et al., Su et al.,

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and Parkhe et al., Ghanayem et al. is directed to a processing system having a single wafer substrate holder, and thus does nothing to cure the deficiencies recited above for claims 1 and 10.

Upon allowance of a generic claim (any of claims 1-4, 8-12 and 16-17), Applicants respectfully request examination of the withdrawn species on which claims 6-7 and 14-15 read.

Applicants are of the opinion that no additional fee is due as a result of this Amendment. If any charges or credits are necessary to complete this communication, please apply them to Deposit Account No. 23-3000.

Respectfully submitted,
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